RESPONSE TO EPA FOLLOW-UP COST COMMENTS

The purpose of this document is to provide additional cost information that CDM Smith requested in a conference call on November 25, 2013. CDM Smith requested the following additional data:

- Backup for long-term monitoring costs of the different technologies and the Site
- Backup for maintenance costs of the different technologies
- Backup for the institutional controls costs
- Cost summary table for each alternative

LONG-TERM TECHNOLOGY MONITORING

Appendix T discusses the scope of the different monitoring elements for each technology. Portions of the text are repeated here for convenience (refer to Appendix T for the complete discussion). Each of the different elements is discussed. The costs presented in Tables 1 through 5 are present day costs. These costs were discounted assuming the different implementation schedules presented below.

Site-wide Monitoring

Certain monitoring elements were assumed to occur over the entire Site, independent of technologies used to monitor the recovery of the Site as a whole. A long-term, site-wide monitoring program over the assumed 30 years would likely include the following:

- Biota tissue chemistry sampling of two select fish species per the findings of the risk assessments
  - 15 composite samples per species per event
  - Sampling of seven events at years 3, 5, 10, 15, 20, 25, and 30
- Surface water chemistry sampling using cross river transect composites
  - Six transect composites
  - Sampling of five events at years 5, 10, 15, 20, and 30
- Surface sediment chemistry sampling
  - 50 composite samples across the entire Site
  - Sampling of 14 events at years 1 to 10, 15, 20, 25, and 30

All these monitoring types should include a baseline monitoring event and sampling of a background area at each event. Sampling techniques and detection levels would be expected to be similar to those used in the Remedial Investigation (RI).

Table 1 presents the cost breakdown used to develop the harbor-wide, long-term monitoring costs.

Monitored Natural Recovery and Enhanced Monitored Natural Recovery Monitoring

The Monitored Natural Recovery (MNR) and Enhanced Monitored Natural Recovery (EMNR) Sediment Management Area (SMA)-specific monitoring program over the assumed 30 years would likely include the following:

- Surface sediment chemistry sampling for each SMA
    - Four composite surface sediment samples per acre of identified MNR area associated with each SMA or area of potential concern per event
    - Sampling of 14 events at years 1 to 10, 15, 20, 25, and 30

Table 2 presents the cost breakdown used to develop MNR/EMNR long-term monitoring costs. The costs were developed assuming that a 10-acre site was monitored, and the costs were then normalized to a per acre cost. For MNR and EMNR, it was assumed that only 10 percent of the MNR/EMNR area would be monitored to serve as a surrogate for the remaining areas. Therefore, the unit cost was reduced to 10 percent.

In Situ Treatment Monitoring

The in situ treatment SMA-specific monitoring program over the assumed 30 years would likely include the following:

- Shallow sediment chemistry cores with co-located porewater chemistry
    - Four cores per acre of in situ treatment area per event
        - Two bulk sediment chemistry samples per core
        - One porewater chemistry sample per core
    - Sampling of 14 events at years 1 to 10, 15, 20, 25, and 30
- One hydrographic survey of the in situ treatment area in each SMA per event
    - Surveys for 14 events at years 1 to 10, 15, 20, 25, and 30

Table 3 presents the cost breakdown used to develop the in situ treatment long-term monitoring costs. The costs were developed assuming that a 10-acre site was monitored, and the costs were then normalized to a per acre cost.

Engineered Cap Monitoring

An engineered cap SMA-specific monitoring program over the assumed 30 years would likely include the following:

- Shallow subsurface sediment cores
    - Four cores (with four sediment samples per core) per acre per event
    - Sampling of 14 events at years 1 to 10, 15, 20, 25, and 30
- One hydrographic survey of the cap area in each SMA per event

- Surveys for 14 events at years 1 to 10, 15, 20, 25, and 30

Table 4 presents the cost breakdown used to develop the engineered cap long-term monitoring costs. The costs were developed assuming that a 10-acre site was monitored, and the costs were then normalized to a per acre cost.

Dredge Area Monitoring

A dredge SMA-specific monitoring program over the assumed 30 years (as discussed above) would likely include:

- Surface sediment samples
  - Four composite samples per acre of dredge area per event
  - Sampling of 10 events at years 1 to 5, 10, 15, 20, 25, and 30

Table 5 presents the cost breakdown used to develop dredging long-term monitoring costs. The costs were developed assuming that a 25-acre site was monitored, and the costs were then normalized to a per acre cost

TECHNOLOGY MAINTENANCE ASSUMPTIONS

A number of assumptions were made to assign costs to address possible future technology maintenance. Section 5.1 of Appendix T presents the assumptions used to develop long-term maintenance costs for the alternatives. These assumptions are as follows:

- MNR and Treatment Technology Areas
  - Five percent of these areas will need to be modified to EMNR or engineered caps in year 10. Half of the areas will be modified to EMNR and the other half to engineered caps.
  - EMNR areas are assumed to cost $400,000 per acre. This cost per acre is a conservative build-up from unit prices presented in Table 3 of Appendix K.
  - Engineering caps are assumed to cost $800,000 per acre. The actual cost per acre will depend on the base cap and armor thickness required. This cost per acre assumes a conservative mid-range cap section and built-up from unit prices presented in Table 3 of Appendix K.
- Engineered Cap Technology Areas
  - Five percent of the engineered cap areas will need to be repaired in years 5 and 10.
  - Engineering cap repair is assumed to cost $800,000.

Present worth costs for maintenance were calculated assuming the present day costs above discounted using the implementation schedules also noted above.

INSTITUTIONAL CONTROLS

Section 5.2 of Appendix T presents the scope of the assumed institutional controls, and Section 2.4 of Appendix K presents the costs assumed for institutional controls. These costs were based on engineering judgment and past experience. The costs of Section 2.4 were discounted assuming the different implementation schedules discussed in Section 2.4.

SUMMARIZED ALTERNATIVE COSTS

At the request of CDM Smith, cost summary tables for each alternative were prepared in a format similar to Exhibit 6-2 of the USEPA (2000) guidance document *A Guide to Developing and Documenting Cost Estimates During the Feasibility Study*. Tables 6 through 10 present this information for each alternative and for both the integrated and removal-focused costs.

REFERENCES

USEPA. 2000. A Guide to Developing and Documenting Cost Estimates During the Feasibility Study. EPA 540-R-00-002. July 2000.

Table 1. Harbor-wide, Long-term Monitoring and Maintenance Cost Backup

	Biota Tissue Monitoring	Six Surface Water Transect Composites	50 Surface Sediment Samples	Mob and Demob	Data Report, Data Management, and Monitoring Report
Labor					
Hours	768	1,020	364	160	1,360
Costs	$91,740	$121,560	$43,360	$18,960	$166,675
Sub-Contractors					
Laboratory analysis	$85,725	$33,264	$151,875		
Boat and core processing	$18,000	$53,180	$18,900		
Data Validation	$9,902	$3,961	$28,290		
Reimursables					
Vehicle rental	$2,000	$2,800	$1,100	$500	
Per diem	$17,500	$24,500	$8,250	$3,750	
Equipment	$4,860	$660	$600	$160	
Subtotal	$229,727	$239,925	$252,375	$23,370	$166,675

Harbor Wide Task[a]	Cost	Cost with 40% Contingency
Tissue monitoring	$420,000	$588,000
Surface water	$430,000	$602,000
Sediment	$442,000	$619,000

Note:

[a] Each task will be conducted separately; include mob and demob plus data management and reporting.

Table 2. MNR/EMNR Long-term Monitoring and Maintenance Cost Backup

	40 Power Grab Samples	Mob and Demob	Data Report, Data Management, and Monitoring Report	Total
Labor				
Hours	308	160	1,220	
Costs	$37,880	$18,960	$149,350	
Sub-Contractors				
Laboratory analysis	$78,840			
Boat and core processing	$18,620			
Data Vaolidation	$10,212			
Reimursables				
Vehicle rental	$900	$400		
Per diem	$8,250	$3,000		
Equipment	$520	$160		
Subtotal	$155,222	$22,520	$149,350	$327,000
Contingency (40%)				$131,000
Total				$458,000
Cost per Acre[a]				$4,600

Note:

[a] Cost normalized for a 10-acre area. As noted in the text, only 10 percent of that area would be monitored to serve as a surrogate for the remaining areas.

Table 3. In Situ Treatment Long-term Monitoring and Maintenance Cost Backup

	40 1-foot Cores and 40 Porewater Samples	Mob and Demob	Data Report, Data Management, and Monitoring Report	Bathymetry	Total
Labor					
Hours	946	460	1,304	0	
Costs	$112,660	$18,960	$159,045	$0	
Sub-Contractors					
Laboratory analysis	$363,600				
Boat and core processing	$24,290				
Data Vaolidation	$43,286				
Bathymetry				$40,000	
Reimursables					
Vehicle rental	$2,600	$400			
Per diem	$19,500	$3,000			
Equipment		$1,925	$160		
Subtotal	$565,936	$24,285	$159,205	$40,000	$789,000
Contingency (40%)					$316,000
Total					$1,105,000
Cost per Acre[a]					$111,000

Note:

[a] Costs normalized for a 10-acre area.

Table 4. Engineered Cap Long-term Monitoring and Maintenance Cost Backup

	40 4-foot Cores, 160 Samples	Mob and Demob	Data Report, Data Management, and Monitoring Report	Bathymetry	Total
Labor					
Hours	586	160	1,352	0	
Costs	$70,060	$18,960	$164,585	$0	
Sub-Contractors					
Laboratory analysis	$315,360				
Boat and core processing	$31,460				
Data Vaolidation	$40,848				
Bathymetry				$40,000	
Reimursables					
Vehicle rental	$1,800	$400			
Per diem	$13,500	$3,000			
Equipment	$660				
Subtotal	$473,688	$22,360	$164,585	$40,000	$701,000
Contingency (40%)					$280,000
Total					$981,000
Cost per Acre[a]					$98,000

Note:

[a] Costs normalized for a 10-acre area.

Table 5. Dredging Long-term Monitoring and Maintenance Cost Backup

	80 Power Grab Samples	Mob and Demob	Data Report, Data Management, and Monitoring Report	Total
Labor				
Hours	740	160	1,280	
Costs	$89,000	$18,960	$156,275	
Sub-Contractors				
Laboratory analysis	$197,100			
Boat and core processing	$41,300			
Data Vaolidation	$25,530			
Reimursables				
Vehicle rental	$2,000	$400		
Per diem	$16,500	$3,750		
Equipment	$1,300	$160		
Subtotal	$372,730	$23,270	$156,275	$552,000
Contingency (40%)				$221,000
Total				$773,000
Cost per Acre[a]				$31,000

Note:

[a] Costs normalized for a 25-acre area.

Table 6. Alternative B Summary of Construction Quantities, Construction Costs and Long Term Monitoring, Maintenance, Operations, and Institutional Controls

Construction Quantities and Costs

Tasks	Unit Costs	Units	Integrated - Low		Integrated - High		Removal Focused - Low		Removal Focused - High	
			Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost
Direct Construction Costs										
Mobilization and Demobilization	15%	%	-	$ 6,644,000	-	$ 12,530,000	-	$ 12,452,000	-	$ 21,354,000
Debris Removal & Disposal	$11,630.00	ACRE	3.55	$ 41,000	3.55	$ 41,000	4.15	$ 48,000	4.15	$ 48,000
Pile Removal & Disposal	$635.00	PILE	12	$ 8,000	12	$ 8,000	31	$ 20,000	31	$ 20,000
Pile Replacement	$6,636.00	PILE	-	$ -	-	$ -	8	$ 53,000	8	$ 53,000
Temporary Dock Relocation	$89,173.00	Dock	-	$ -	-	$ -	-	$ -	-	$ -
Dredging & Transport to Offloading Facility										
Purchase, Install and Maintain Silt Curtains	$86.00	LF	-	$ -	-	$ -	-	$ -	-	$ -
Dredging										
Open water	$33.80	CY	160,997	$ 5,442,000	255,710	$ 8,643,000	403,518	$ 13,639,000	611,756	$ 20,677,000
Confined or shallow water	$47.70	CY	-	$ -	-	$ -	68,520	$ 3,268,000	101,268	$ 4,831,000
Dredging from shore	$41.60	CY	-	$ -	-	$ -	1,103	$ 46,000	2,223	$ 92,000
Residual Dredging	$79.60	CY	37,373	$ 2,975,000	37,373	$ 2,975,000	67,942	$ 5,408,000	67,942	$ 5,408,000
Miscellaneous										
Stabilization	$31.30	CY	-	$ -	-	$ -	-	$ -	-	$ -
Barge Transportation	$126.00	MILE	-	$ -	-	$ -	-	$ -	-	$ -
Hydraulically Offloading	$5.60	CY	198,370	$ 1,111,000	-	$ -	538,411	$ 3,015,000	-	$ -
Capping										
Material Purchase and Deliver										
Base Cap - Sand	$14.60	TON	228,054	$ 3,330,000	298,429	$ 4,357,000	176,187	$ 2,572,000	176,187	$ 2,572,000
Armor A material	$18.00	TON	-	$ -	13,246	$ 238,000	66	$ 1,000	66	$ 1,000
Armor B material	$18.00	TON	27,270	$ 491,000	61,547	$ 1,108,000	20,486	$ 369,000	20,486	$ 369,000
Armor C material	$18.00	TON	-	$ -	1,702	$ 31,000	280	$ 5,000	280	$ 5,000
Armor ODOT 200 material	$31.50	TON	54,540	$ 1,718,000	95,374	$ 3,004,000	24,605	$ 775,000	24,605	$ 775,000
Cap Material Placement										
Open Water Placement										
Base Cap - Open Water	$17.60	TON	18,180	$ 320,000	56,520	$ 995,000	13,066	$ 230,000	13,066	$ 230,000
Armor - Open Water	$15.50	TON	81,811	$ 1,268,000	100,982	$ 1,565,000	5,227	$ 81,000	23,519	$ 365,000
Organoclay Mat - Open Water (Purchase and Place)	$6.30	SF	-	$ -	286,639	$ 1,806,000	-	$ -	-	$ -
EMNR Layer - Open Water	$22.00	TON	173,014	$ 3,806,000	173,014	$ 3,806,000	93,709	$ 2,062,000	93,709	$ 2,062,000
Residuals Cap - Open Water	$22.00	TON	28,030	$ 617,000	28,030	$ 617,000	46,563	$ 1,024,000	46,563	$ 1,024,000
Backfill - Open Water	$17.60	TON	-	$ -	-	$ -	-	$ -	-	$ -
Confined or Under Pier Placement										
Base Cap	$36.20	TON	-	$ -	32,036	$ 1,160,000	19,893	$ 720,000	19,893	$ 720,000
Armor	$32.00	TON	-	$ -	70,887	$ 2,268,000	21,917	$ 701,000	21,917	$ 701,000
Organoclay Mat (Purchase and Place)	$21.10	SF	-	$ -	150,898	$ 3,184,000	-	$ -	-	$ -
EMNR Layer	$45.30	TON	8,829	$ 400,000	8,829	$ 400,000	6,402	$ 290,000	6,402	$ 290,000
Residuals Cap	$45.30	TON	-	$ -	-	$ -	4,394	$ 199,000	4,394	$ 199,000
Backfill	$36.20	TON	-	$ -	-	$ -	-	$ -	-	$ -
In Situ Treatment										
In Situ Treatment - Open Water	$4.50	SF	419,865	$ 1,889,000	-	$ -	-	$ -	-	$ -
In Situ Treatment - Confined/Underpier	$5.80	SF	421,795	$ 2,446,000	-	$ -	-	$ -	-	$ -

Table 6. Alternative B Summary of Construction Quantities, Construction Costs and Long Term Monitoring, Maintenance, Operations, and Institutional Controls

Construction Quantities and Costs

Tasks	Unit Costs	Units	Integrated - Low		Integrated - High		Removal Focused - Low		Removal Focused - High	
			Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost
DSL Land Purchase	$142,876.80	ACRE	5.24	$ 749,000	21.96	$ 3,138,000	6.12	$ 875,000	6.12	$ 875,000
Mitigation (1)										
On site	$2,260,000.00	ACRE	-	$ -	3.36	$ 7,591,000	-	$ -	2.79	$ 6,309,000
Off site	$350,000.00	ACRE	0.64	$ 226,000	-	$ -	0.67	$ 236,000	-	$ -
Disposal										
Upland Subtitle D	$79.00	TON	9,325	$ 737,000	426,923	$ 33,727,000	13,855	$ 1,095,000	1,161,703	$ 91,775,000
Upland Subtitle C	$226.00	TON	-	$ -	12,703	$ 2,871,000	-	$ -	13,082	$ 2,957,000
In-Water CDF	$87.00	CY	192,153	$ 16,717,000	-	$ -	532,005	$ 46,284,000	-	$ -
Total Direct Construction Costs			**-**	**$ 50,935,000**	**-**	**$ 96,063,000**	**-**	**$ 95,468,000**	**-**	**$ 163,712,000**
Indirect Construction Costs			**-**		**-**		**-**		**-**	
Design	15%	%	-	$ 7,640,000	-	$ 14,409,000	-	$ 14,320,000	-	$ 24,557,000
Daily Responsible Party oversight and project management	$292,000.00	Monthly	30.95	$ 9,036,000	39.54	$ 11,546,000	67.56	$ 19,727,000	70.15	$ 20,484,000
Daily Agency Oversight and Project Management including Environmental Monitoring	$100,000.00	Monthly	30.95	$ 3,095,000	39.54	$ 3,954,000	67.56	$ 6,756,000	70.15	$ 7,015,000
Engineering Support During Construction	$78,000.00	Monthly	30.95	$ 2,414,000	39.54	$ 3,084,000	67.56	$ 5,270,000	70.15	$ 5,472,000
Special Insurance, Bonding	5%	%	-	$ 2,547,000	-	$ 4,803,000	-	$ 4,773,000	-	$ 8,186,000
Total Indirect Construction Costs			**-**	**$ 24,732,000**	**-**	**$ 37,796,000**	**-**	**$ 50,846,000**	**-**	**$ 65,714,000**
Total Capital Costs			**-**	**$ 75,667,000**	**-**	**$ 133,859,000**	**-**	**$ 146,314,000**	**-**	**$ 229,426,000**
Contingency	**40%**	**%**	**-**	**$ 20,374,000**	**-**	**$ 38,425,200**	**-**	**$ 38,187,200**	**-**	**$ 65,484,800**
Engineer's Opinion of Probable Cost (Non-Discounted Construction Costs)			**-**	**$ 96,041,000**	**-**	**$ 172,284,200**	**-**	**$ 184,501,200**	**-**	**$ 294,910,800**
Average Discount Factor[a]				**0.97**		**0.97**		**0.93**		**0.93**
Discounted Construction Costs				**$ 93,000,000**		**$ 167,000,000**		**$ 172,000,000**		**$ 275,000,000**

Long Term Monitoring, Maintenance, Operations, and Institutional Controls Costs

Category	Integrated - Low	Integrated - High	Removal Focused - Low	Removal Focused - High
Non-Discounted Long Term Monitoring, Maintenance, and Operations Costs	**$ 89,700,000**	**$ 97,900,000**	**$ 69,800,000**	**$ 69,800,000**
Non-Discounted Institutional Controls Costs	**$ 12,100,000**	**$ 12,100,000**	**$ 11,700,000**	**$ 11,700,000**
Average Discount Factor[b]	**0.75**	**0.75**	**0.69**	**0.69**
Discounted Long Term Monitoring, Maintenance, Operations, and Institutional Controls Costs	**$ 76,600,000**	**$ 82,900,000**	**$ 56,400,000**	**$ 56,400,000**

Total Net Present Value Cost of Alternative[c]	**$ 170,000,000**	**$ 250,000,000**	**$ 228,000,000**	**$ 331,000,000**

Notes:

[a] Discount Factors for Construction Costs were applied to each SMA and Alternative based on construction sequencing assumptions. For a breakdown of discount factors by SMA and Alternative see Table 2, Appendix K of the LWG FS submitted to EPA March 30, 2012.

[b] Discount Factors for Long Term Monitoring, Maintenance, Operations, and Institutional Controls were applied on an Alternative-wide basis assuming that monitoring operations for some SMAs would commence prior to the completion of all remedial activities for a particular Alternative.

[c] The Total Net Present Value Cost for each Alternative is the sum of the Discounted Construction Costs, and the Discounted Long Term Monitoring, Maintenance, Operations, and Institutional Controls Costs.

Table 7. Alternative C Summary of Construction Quantities, Construction Costs and Long Term Monitoring, Maintenance, Operations, and Institutional Controls

Construction Quantities and Costs

Tasks	Unit Costs	Units	Integrated - Low		Integrated - High		Removal Focused - Low		Removal Focused - High	
			Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost
Direct Construction Costs										
Mobilization and Demobilization	15%	%	-	$ 9,556,000	-	$ 18,752,000	-	$ 18,000,000	-	$ 30,866,000
Debris Removal & Disposal	$11,630.00	ACRE	4.14	$ 48,000	4.14	$ 48,000	4.98	$ 58,000	4.98	$ 58,000
Pile Removal & Disposal	$635.00	PILE	14	$ 9,000	14	$ 9,000	50	$ 32,000	50	$ 32,000
Pile Replacement	$6,636.00	PILE	1	$ 7,000	1	$ 7,000	4	$ 27,000	4	$ 27,000
Temporary Dock Relocation	$89,173.00	Dock	1	$ 89,000	1	$ 89,000	1	$ 89,000	1	$ 89,000
Dredging & Transport to Offloading Facility										
Purchase, Install and Maintain Silt Curtains	$86.00	LF	-	$ -	-	$ -	-	$ -	-	$ -
Dredging										
Open water	$33.80	CY	258,886	$ 8,750,000	404,283	$ 13,665,000	620,509	$ 20,973,000	943,698	$ 31,897,000
Confined or shallow water	$47.70	CY	-	$ -	-	$ -	51,909	$ 2,476,000	77,450	$ 3,694,000
Dredging from shore	$41.60	CY	-	$ -	-	$ -	1,538	$ 64,000	3,036	$ 126,000
Residual Dredging	$79.60	CY	54,912	$ 4,371,000	54,912	$ 4,371,000	102,432	$ 8,154,000	102,432	$ 8,154,000
Miscellaneous										
Stabilization	$31.30	CY	-	$ -	-	$ -	-	$ -	-	$ -
Barge Transportation	$126.00	MILE	-	$ -	-	$ -	-	$ -	-	$ -
Hydraulically Offloading	$5.60	CY	313,798	$ 1,757,000	-	$ -	773,039	$ 4,329,000	-	$ -
Capping										
Material Purchase and Deliver										
Base Cap - Sand	$14.60	TON	171,085	$ 2,498,000	277,026	$ 4,045,000	288,947	$ 4,219,000	288,947	$ 4,219,000
Armor A material	$18.00	TON	-	$ -	22,765	$ 410,000	425	$ 8,000	425	$ 8,000
Armor B material	$18.00	TON	50,482	$ 909,000	98,330	$ 1,770,000	28,670	$ 516,000	28,670	$ 516,000
Armor C material	$18.00	TON	-	$ -	2,056	$ 37,000	476	$ 9,000	476	$ 9,000
Armor ODOT 200 material	$31.50	TON	100,964	$ 3,180,000	158,517	$ 4,993,000	35,559	$ 1,120,000	35,559	$ 1,120,000
Cap Material Placement										
Open Water Placement										
Base Cap - Open Water	$17.60	TON	33,655	$ 592,000	93,994	$ 1,654,000	19,415	$ 342,000	19,415	$ 342,000
Armor - Open Water	$15.50	TON	151,446	$ 2,347,000	181,617	$ 2,815,000	7,766	$ 120,000	34,947	$ 542,000
Organoclay Mat - Open Water (Purchase and Place)	$6.30	SF	-	$ -	364,806	$ 2,298,000	-	$ -	-	$ -
EMNR Layer - Open Water	$22.00	TON	89,984	$ 1,980,000	89,984	$ 1,980,000	168,300	$ 3,703,000	168,300	$ 3,703,000
Residuals Cap - Open Water	$22.00	TON	41,184	$ 906,000	41,184	$ 906,000	72,090	$ 1,586,000	72,090	$ 1,586,000
Backfill - Open Water	$17.60	TON	-	$ -	-	$ -	-	$ -	-	$ -
Confined or Under Pier Placement										
Base Cap	$36.20	TON	-	$ -	45,602	$ 1,651,000	27,431	$ 993,000	27,431	$ 993,000
Armor	$32.00	TON	-	$ -	100,050	$ 3,202,000	30,182	$ 966,000	30,182	$ 966,000
Organoclay Mat (Purchase and Place)	$21.10	SF	-	$ -	169,266	$ 3,572,000	-	$ -	-	$ -
EMNR Layer	$45.30	TON	6,262	$ 284,000	6,262	$ 284,000	8,626	$ 391,000	8,626	$ 391,000
Residuals Cap	$45.30	TON	-	$ -	-	$ -	4,733	$ 214,000	4,733	$ 214,000

Table 7. Alternative C Summary of Construction Quantities, Construction Costs and Long Term Monitoring, Maintenance, Operations, and Institutional Controls

Construction Quantities and Costs

Tasks	Unit Costs	Units	Integrated - Low		Integrated - High		Removal Focused - Low		Removal Focused - High	
			Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost
Backfill	$36.20	TON	-	$ -	-	$ -	-	$ -	-	$ -
In Situ Treatment										
In Situ Treatment - Open Water	$4.50	SF	671,270	$ 3,021,000	-	$ -	-	$ -	-	$ -
In Situ Treatment - Confined/Underpier	$5.80	SF	598,184	$ 3,469,000	-	$ -	-	$ -	-	$ -
DSL Land Purchase	$142,876.80	ACRE	9.90	$ 1,414,000	34.56	$ 4,938,000	8.35	$ 1,193,000	8.35	$ 1,193,000
Mitigation (1)										
On site	$2,260,000.00	ACRE	-	$ -	6.70	$ 15,141,000	-	$ -	3.51	$ 7,928,000
Off site	$350,000.00	ACRE	1.43	$ 501,000	-	$ -	0.73	$ 254,000	-	$ -
Disposal										
Upland Subtitle D	$79.00	TON	13,120	$ 1,037,000	670,325	$ 52,956,000	27,673	$ 2,186,000	1,659,562	$ 131,105,000
Upland Subtitle C	$226.00	TON	-	$ -	18,468	$ 4,174,000	-	$ -	30,362	$ 6,862,000
In-Water CDF	$87.00	CY	305,051	$ 26,539,000	-	$ -	758,345	$ 65,976,000	-	$ -
Total Direct Construction Costs			**-**	**$ 73,264,000**	**-**	**$ 143,767,000**	**-**	**$ 137,998,000**	**-**	**$ 236,640,000**
Indirect Construction Costs			**-**		**-**		**-**		**-**	
Design	15%	%	-	$ 10,990,000	-	$ 21,565,000	-	$ 20,700,000	-	$ 35,496,000
Daily Responsible Party oversight and project management	$292,000.00	Monthly	45.81	$ 13,375,000	57.29	$ 16,729,000	94.10	$ 27,479,000	96.29	$ 28,117,000
Daily Agency Oversight and Project Management including Environmental Monitoring	$100,000.00	Monthly	45.81	$ 4,581,000	57.29	$ 5,729,000	94.10	$ 9,410,000	96.29	$ 9,629,000
Engineering Support During Construction	$78,000.00	Monthly	45.81	$ 3,573,000	57.29	$ 4,469,000	94.10	$ 7,340,000	96.29	$ 7,511,000
Special Insurance, Bonding	5%	%	-	$ 3,663,000	-	$ 7,188,000	-	$ 6,900,000	-	$ 11,832,000
Total Indirect Construction Costs			**-**	**$ 36,182,000**	**-**	**$ 55,680,000**	**-**	**$ 71,829,000**	**-**	**$ 92,585,000**
Total Capital Costs			**-**	**$ 109,446,000**	**-**	**$ 199,447,000**	**-**	**$ 209,827,000**	**-**	**$ 329,225,000**
Contingency	**40%**	**%**	**-**	**$ 29,306,000**	**-**	**$ 57,507,000**	**-**	**$ 55,199,000**	**-**	**$ 94,656,000**
Engineer's Opinion of Probable Cost (Non-Discounted Construction Costs)			**-**	**$ 138,752,000**	**-**	**$ 256,954,000**	**-**	**$ 265,026,000**	**-**	**$ 423,881,000**
Average Discount Factor[a]				**0.97**		**0.97**		**0.91**		**0.91**
Discounted Construction Costs				**$ 134,000,000**		**$ 248,000,000**		**$ 242,000,000**		**$ 387,000,000**

Long Term Monitoring, Maintenance, Operations, and Institutional Controls Costs

Category	Integrated - Low	Integrated - High	Removal Focused - Low	Removal Focused - High
Non-Discounted Long Term Monitoring, Maintenance, and Operations Costs	**$ 119,100,000**	**$ 119,200,000**	**$ 80,900,000**	**$ 80,900,000**
Non-Discounted Institutional Controls Costs	**$ 12,500,000**	**$ 12,500,000**	**$ 12,000,000**	**$ 12,000,000**
Average Discount Factor[b]	**0.74**	**0.74**	**0.67**	**0.67**
Discounted Long Term Monitoring, Maintenance, Operations, and Institutional Controls Costs	**$ 97,200,000**	**$ 97,400,000**	**$ 62,200,000**	**$ 62,200,000**

Total Net Present Value Cost of Alternative[c]	**$ 231,000,000**	**$ 345,000,000**	**$ 304,000,000**	**$ 449,000,000**

Notes:

[a] Discount Factors for Construction Costs were applied to each SMA and Alternative based on construction sequencing assumptions. For a breakdown of discount factors by SMA and Alternative see Table 2, Appendix K of the LWG FS submitted to EPA March 30, 2012.

[b] Discount Factors for Long Term Monitoring, Maintenance, Operations, and Institutional Controls were applied on an Alternative-wide basis assuming that monitoring operations for some SMAs would commence prior to the completion of all remedial activities for a particular Alternative.

[c] The Total Net Present Value Cost for each Alternative is the sum of the Discounted Construction Costs, and the Discounted Long Term Monitoring, Maintenance, Operations, and Institutional Controls Costs.

Table 8. Alternative D Summary of Construction Quantities, Construction Costs and Long Term Monitoring, Maintenance, Operations, and Institutional Controls

Construction Quantities and Costs

Tasks	Unit Costs	Units	Integrated - Low		Integrated - High		Removal Focused - Low		Removal Focused - High	
			Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost
Direct Construction Costs										
Mobilization and Demobilization	15%	%	-	$ 11,507,000	-	$ 22,208,000	-	$ 21,126,000	-	$ 36,061,000
Debris Removal & Disposal	$11,630.00	ACRE	4.99	$ 58,000	4.99	$ 58,000	6.03	$ 70,000	6.03	$ 70,000
Pile Removal & Disposal	$635.00	PILE	25	$ 16,000	25	$ 16,000	85	$ 54,000	85	$ 54,000
Pile Replacement	$6,636.00	PILE	2	$ 10,000	2	$ 10,000	5	$ 30,000	5	$ 30,000
Temporary Dock Relocation	$89,173.00	Dock	6	$ 535,000	6	$ 535,000	6	$ 535,000	6	$ 535,000
Dredging & Transport to Offloading Facility										
Purchase, Install and Maintain Silt Curtains	$86.00	LF	-	$ -	-	$ -	-	$ -	-	$ -
Dredging										
Open water	$33.80	CY	317,271	$ 10,724,000	494,799	$ 16,724,000	722,461	$ 24,419,000	1,098,092	$ 37,116,000
Confined or shallow water	$47.70	CY	-	$ -	-	$ -	61,308	$ 2,924,000	91,037	$ 4,342,000
Dredging from shore	$41.60	CY	-	$ -	-	$ -	3,489	$ 145,000	5,843	$ 243,000
Residual Dredging	$79.60	CY	69,637	$ 5,543,000	69,637	$ 5,543,000	126,339	$ 10,057,000	126,339	$ 10,057,000
Miscellaneous										
Stabilization	$31.30	CY	-	$ -	-	$ -	-	$ -	-	$ -
Barge Transportation	$126.00	MILE	-	$ -	-	$ -	-	$ -	-	$ -
Hydraulically Offloading	$5.60	CY	386,908	$ 2,167,000	-	$ -	908,117	$ 5,085,000	-	$ -
Capping										
Material Purchase and Deliver										
Base Cap - Sand	$14.60	TON	179,734	$ 2,624,000	303,994	$ 4,438,000	304,010	$ 4,439,000	304,010	$ 4,439,000
Armor A material	$18.00	TON	-	$ -	26,403	$ 475,000	1,146	$ 21,000	1,146	$ 21,000
Armor B material	$18.00	TON	57,626	$ 1,037,000	114,146	$ 2,055,000	35,580	$ 640,000	35,580	$ 640,000
Armor C material	$18.00	TON	-	$ -	2,220	$ 40,000	492	$ 9,000	492	$ 9,000
Armor ODOT 200 material	$31.50	TON	115,252	$ 3,630,000	182,627	$ 5,753,000	42,764	$ 1,347,000	42,764	$ 1,347,000
Cap Material Placement										
Open Water Placement										
Base Cap - Open Water	$17.60	TON	38,417	$ 676,000	106,524	$ 1,875,000	22,730	$ 400,000	22,730	$ 400,000
Armor - Open Water	$15.50	TON	172,877	$ 2,680,000	206,932	$ 3,207,000	15,718	$ 244,000	44,384	$ 688,000
Organoclay Mat - Open Water (Purchase and Place)	$6.30	SF	-	$ -	389,099	$ 2,451,000	-	$ -	-	$ -
EMNR Layer - Open Water	$22.00	TON	82,995	$ 1,826,000	82,995	$ 1,826,000	155,240	$ 3,415,000	155,240	$ 3,415,000
Residuals Cap - Open Water	$22.00	TON	52,228	$ 1,149,000	52,228	$ 1,149,000	88,806	$ 1,954,000	88,806	$ 1,954,000
Backfill - Open Water	$17.60	TON	-	$ -	-	$ -	-	$ -	-	$ -
Confined or Under Pier Placement										
Base Cap	$36.20	TON	-	$ -	56,154	$ 2,033,000	35,236	$ 1,276,000	35,236	$ 1,276,000
Armor	$32.00	TON	-	$ -	118,464	$ 3,791,000	35,599	$ 1,139,000	35,599	$ 1,139,000
Organoclay Mat (Purchase and Place)	$21.10	SF	-	$ -	169,288	$ 3,572,000	-	$ -	-	$ -
EMNR Layer	$45.30	TON	6,094	$ 276,000	6,094	$ 276,000	8,335	$ 378,000	8,335	$ 378,000
Residuals Cap	$45.30	TON	-	$ -	-	$ -	5,949	$ 269,000	5,949	$ 269,000
Backfill	$36.20	TON	-	$ -	-	$ -	-	$ -	-	$ -
In Situ Treatment										

Table 8. Alternative D Summary of Construction Quantities, Construction Costs and Long Term Monitoring, Maintenance, Operations, and Institutional Controls

Construction Quantities and Costs

Tasks	Unit Costs	Units	Integrated - Low		Integrated - High		Removal Focused - Low		Removal Focused - High	
			Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost
In Situ Treatment - Open Water	$4.50	SF	754,446	$ 3,395,000	-	$ -	-	$ -	-	$ -
In Situ Treatment - Confined/Underpier	$5.80	SF	731,070	$ 4,240,000	-	$ -	-	$ -	-	$ -
DSL Land Purchase	$142,876.80	ACRE	11.34	$ 1,621,000	39.65	$ 5,665,000	10.58	$ 1,512,000	10.58	$ 1,512,000
Mitigation (1)										
On site	$2,260,000.00	ACRE	-	$ -	7.50	$ 16,958,000	-	$ -	4.00	$ 9,040,000
Off site	$350,000.00	ACRE	1.62	$ 568,000	-	$ -	0.77	$ 268,000	-	$ -
Disposal										
Upland Subtitle D	$79.00	TON	13,120	$ 1,037,000	828,187	$ 65,427,000	32,892	$ 2,598,000	1,948,910	$ 153,964,000
Upland Subtitle C	$226.00	TON	-	$ -	18,468	$ 4,174,000	-	$ -	33,057	$ 7,471,000
In-Water CDF	$87.00	CY	378,161	$ 32,900,000	-	$ -	892,075	$ 77,611,000	-	$ -
Total Direct Construction Costs			**-**	**$ 88,219,000**	**-**	**$ 170,259,000**	**-**	**$ 161,965,000**	**-**	**$ 276,470,000**
Indirect Construction Costs			-		-		-		-	
Design	15%	%	-	$ 13,233,000	-	$ 25,539,000	-	$ 24,295,000	-	$ 41,471,000
Daily Responsible Party oversight and project management	$292,000.00	Monthly	55.88	$ 16,318,000	68.95	$ 20,133,000	111.63	$ 32,597,000	113.92	$ 33,266,000
Daily Agency Oversight and Project Management including Environmental Monitoring	$100,000.00	Monthly	55.88	$ 5,588,000	68.95	$ 6,895,000	111.63	$ 11,163,000	113.92	$ 11,392,000
Engineering Support During Construction	$78,000.00	Monthly	55.88	$ 4,359,000	68.95	$ 5,378,000	111.63	$ 8,707,000	113.92	$ 8,886,000
Special Insurance, Bonding	5%	%	-	$ 4,411,000	-	$ 8,513,000	-	$ 8,098,000	-	$ 13,824,000
Total Indirect Construction Costs			**-**	**$ 43,909,000**	**-**	**$ 66,458,000**	**-**	**$ 84,860,000**	**-**	**$ 108,839,000**
Total Capital Costs			**-**	**$ 132,128,000**	**-**	**$ 236,717,000**	**-**	**$ 246,825,000**	**-**	**$ 385,309,000**
Contingency	**40%**	**%**	**-**	**$ 35,288,000**	**-**	**$ 68,104,000**	**-**	**$ 64,786,000**	**-**	**$ 110,588,000**
Engineer's Opinion of Probable Cost (Non-Discounted Construction Costs)			**-**	**$ 167,416,000**	**-**	**$ 304,821,000**	**-**	**$ 311,611,000**	**-**	**$ 495,897,000**
Average Discount Factor[1]				**0.96**		**0.96**		**0.91**		**0.92**
Discounted Construction Costs				**$ 160,000,000**		**$ 292,000,000**		**$ 285,000,000**		**$ 454,000,000**

Long Term Monitoring, Maintenance, Operations, and Institutional Controls Costs

Category	Integrated - Low	Integrated - High	Removal Focused - Low	Removal Focused - High
Non-Discounted Long Term Monitoring, Maintenance, and Operations Costs	**$ 130,800,000**	**$ 130,500,000**	**$ 87,800,000**	**$ 87,800,000**
Non-Discounted Institutional Controls Costs	**$ 12,800,000**	**$ 12,800,000**	**$ 12,400,000**	**$ 12,400,000**
Average Discount Factor[2]	**0.74**	**0.74**	**0.65**	**0.65**
Discounted Long Term Monitoring, Maintenance, Operations, and Institutional Controls Costs	**$ 106,200,000**	**$ 106,000,000**	**$ 65,500,000**	**$ 65,500,000**

Total Net Present Value Cost of Alternative[c]	**$ 266,000,000**	**$ 398,000,000**	**$ 351,000,000**	**$ 520,000,000**

Notes:

[a] Discount Factors for Construction Costs were applied to each SMA and Alternative based on construction sequencing assumptions. For a breakdown of discount factors by SMA and Alternative see Table 2, Appendix K of the LWG FS submitted to EPA March 30, 2012.

[b] Discount Factors for Long Term Monitoring, Maintenance, Operations, and Institutional Controls were applied on an Alternative-wide basis assuming that monitoring operations for some SMAs would commence prior to the completion of all remedial activities for a particular Alternative.

[c] The Total Net Present Value Cost for each Alternative is the sum of the Discounted Construction Costs, and the Discounted Long Term Monitoring, Maintenance, Operations, and Institutional Controls Costs.

Table 9. Alternative E Summary of Construction Quantities, Construction Costs and Long Term Monitoring, Maintenance, Operations, and Institutional Controls

Construction Quantities and Costs

Tasks	Unit Costs	Units	Integrated - Low		Integrated - High		Removal Focused - Low		Removal Focused - High	
			Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost
Direct Construction Costs										
Mobilization and Demobilization	15%	%	-	$ 24,487,000	-	$ 45,863,000	-	$ 39,216,000	-	$ 68,841,000
Debris Removal & Disposal	$11,630.00	ACRE	11.83	$ 138,000	11.83	$ 138,000	14.48	$ 168,000	14.48	$ 168,000
Pile Removal & Disposal	$635.00	PILE	1	$ 1,000	1	$ 1,000	16	$ 10,000	16	$ 10,000
Pile Replacement	$6,636.00	PILE	21	$ 139,000	21	$ 139,000	115	$ 763,000	115	$ 763,000
Temporary Dock Relocation	$89,173.00	Dock	10	$ 892,000	10	$ 892,000	17	$ 1,553,000	17	$ 1,553,000
Dredging & Transport to Offloading Facility										
Purchase, Install and Maintain Silt Curtains	$86.00	LF	-	$ -	-	$ -	-	$ -	-	$ -
Dredging										
Open water	$33.80	CY	789,315	$ 26,679,000	1,214,977	$ 41,066,000	1,433,328	$ 48,446,000	2,204,278	$ 74,505,000
Confined or shallow water	$47.70	CY	-	$ -	-	$ -	99,264	$ 4,735,000	145,321	$ 6,932,000
Dredging from shore	$41.60	CY	-	$ -	-	$ -	7,178	$ 299,000	11,294	$ 470,000
Residual Dredging	$79.60	CY	147,153	$ 11,713,000	147,153	$ 11,713,000	234,921	$ 18,700,000	234,921	$ 18,700,000
Miscellaneous										
Stabilization	$31.30	CY	-	$ -	-	$ -	-	$ -	-	$ -
Barge Transportation	$126.00	MILE	-	$ -	-	$ -	-	$ -	-	$ -
Hydraulically Offloading	$5.60	CY	936,468	$ 5,244,000	-	$ -	1,765,165	$ 9,885,000	-	$ -
Capping										
Material Purchase and Deliver										
Base Cap - Sand	$14.60	TON	213,821	$ 3,122,000	426,175	$ 6,222,000	282,919	$ 4,131,000	282,919	$ 4,131,000
Armor A material	$18.00	TON	-	$ -	52,464	$ 944,000	1,168	$ 21,000	1,168	$ 21,000
Armor B material	$18.00	TON	100,791	$ 1,814,000	184,830	$ 3,327,000	59,071	$ 1,063,000	59,071	$ 1,063,000
Armor C material	$18.00	TON	-	$ -	2,159	$ 39,000	510	$ 9,000	510	$ 9,000
Armor ODOT 200 material	$31.50	TON	201,583	$ 6,350,000	297,416	$ 9,369,000	76,166	$ 2,399,000	76,166	$ 2,399,000
Cap Material Placement										
Open Water Placement										
Base Cap - Open Water	$17.60	TON	67,194	$ 1,183,000	200,325	$ 3,526,000	44,544	$ 784,000	44,544	$ 784,000
Armor - Open Water	$15.50	TON	302,374	$ 4,687,000	368,941	$ 5,719,000	45,090	$ 699,000	59,725	$ 926,000
Organoclay Mat - Open Water (Purchase and Place)	$6.30	SF	-	$ -	517,697	$ 3,261,000	-	$ -	-	$ -
EMNR Layer - Open Water	$22.00	TON	32,888	$ 724,000	32,888	$ 724,000	32,888	$ 724,000	32,888	$ 724,000
Residuals Cap - Open Water	$22.00	TON	110,365	$ 2,428,000	110,365	$ 2,428,000	166,066	$ 3,653,000	166,066	$ 3,653,000
Backfill - Open Water	$17.60	TON	-	$ -	-	$ -	-	$ -	-	$ -
Confined or Under Pier Placement										
Base Cap	$36.20	TON	-	$ -	79,223	$ 2,868,000	56,172	$ 2,033,000	56,172	$ 2,033,000
Armor	$32.00	TON	-	$ -	167,928	$ 5,374,000	53,212	$ 1,703,000	53,212	$ 1,703,000
Organoclay Mat (Purchase and Place)	$21.10	SF	-	$ -	91,220	$ 1,925,000	-	$ -	-	$ -
EMNR Layer	$45.30	TON	3,374	$ 153,000	3,374	$ 153,000	3,374	$ 153,000	3,374	$ 153,000
Residuals Cap	$45.30	TON	-	$ -	-	$ -	10,125	$ 459,000	10,125	$ 459,000
Backfill	$36.20	TON	-	$ -	-	$ -	-	$ -	-	$ -
In Situ Treatment										
In Situ Treatment - Open Water	$4.50	SF	1,478,894	$ 6,655,000	-	$ -	-	$ -	-	$ -
In Situ Treatment - Confined/Underpier	$5.80	SF	1,037,624	$ 6,018,000	-	$ -	-	$ -	-	$ -

Table 9. Alternative E Summary of Construction Quantities, Construction Costs and Long Term Monitoring, Maintenance, Operations, and Institutional Controls

Construction Quantities and Costs

Tasks	Unit Costs	Units	Integrated - Low		Integrated - High		Removal Focused - Low		Removal Focused - High	
			Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost
DSL Land Purchase	$142,876.80	ACRE	18.85	$ 2,693,000	68.26	$ 9,753,000	16.95	$ 2,422,000	16.95	$ 2,422,000
Mitigation (1)										
On site	$2,260,000.00	ACRE	-	$ -	14.16	$ 32,002,000	-	$ -	5.21	$ 11,772,000
Off site	$350,000.00	ACRE	2.46	$ 860,000	-	$ -	1.30	$ 455,000	-	$ -
Disposal										
Upland Subtitle D	$79.00	TON	13,352	$ 1,055,000	2,024,418	$ 159,929,000	84,685	$ 6,690,000	3,784,997	$ 299,015,000
Upland Subtitle C	$226.00	TON	-	$ -	18,777	$ 4,244,000	-	$ -	108,725	$ 24,572,000
In-Water CDF	$87.00	CY	927,567	$ 80,698,000	-	$ -	1,718,234	$ 149,486,000	-	$ -
Total Direct Construction Costs			**-**	**$ 187,733,000**	**-**	**$ 351,619,000**	**-**	**$ 300,659,000**	**-**	**$ 527,781,000**
Indirect Construction Costs			-		-		-		-	
Design	15%	%	-	$ 28,160,000	-	$ 52,743,000	-	$ 45,099,000	-	$ 79,167,000
Daily Responsible Party oversight and project management	$292,000.00	Monthly	120.89	$ 35,300,000	138.22	$ 40,360,000	208.11	$ 60,769,000	212.30	$ 61,991,000
Daily Agency Oversight and Project Management including Environmental Monitoring	$100,000.00	Monthly	120.89	$ 12,089,000	138.22	$ 13,822,000	208.11	$ 20,811,000	212.30	$ 21,230,000
Engineering Support During Construction	$78,000.00	Monthly	120.89	$ 9,430,000	138.22	$ 10,781,000	208.11	$ 16,233,000	212.30	$ 16,559,000
Special Insurance, Bonding	5%	%	-	$ 9,387,000	-	$ 17,581,000	-	$ 15,033,000	-	$ 26,389,000
Total Indirect Construction Costs			**-**	**$ 94,366,000**	**-**	**$ 135,287,000**	**-**	**$ 157,945,000**	**-**	**$ 205,336,000**
Total Capital Costs			**-**	**$ 282,099,000**	**-**	**$ 486,906,000**	**-**	**$ 458,604,000**	**-**	**$ 733,117,000**
Contingency	**40%**	**%**	**-**	**$ 75,093,000**	**-**	**$ 140,648,000**	**-**	**$ 120,264,000**	**-**	**$ 211,112,000**
Engineer's Opinion of Probable Cost (Non-Discounted Construction Costs)			**-**	**$ 357,192,000**	**-**	**$ 627,554,000**	**-**	**$ 578,868,000**	**-**	**$ 944,229,000**
Average Discount Factor[1]			**0.91**		**0.91**		**0.86**		**0.86**	
Discounted Construction Costs				**$ 325,000,000**		**$ 573,000,000**		**$ 495,000,000**		**$ 811,000,000**

Long Term Monitoring, Maintenance, Operations, and Institutional Controls Costs

Category	Integrated - Low	Integrated - High	Removal Focused - Low	Removal Focused - High
Non-Discounted Long Term Monitoring, Maintenance, and Operations Costs	**$ 189,900,000**	**$ 186,700,000**	**$ 108,400,000**	**$ 108,400,000**
Non-Discounted Institutional Controls Costs	**$ 13,500,000**	**$ 13,500,000**	**$ 13,000,000**	**$ 13,000,000**
Average Discount Factor[2]	**0.68**	**0.68**	**0.60**	**0.60**
Discounted Long Term Monitoring, Maintenance, Operations, and Institutional Controls Costs	**$ 137,800,000**	**$ 135,900,000**	**$ 72,700,000**	**$ 72,700,000**

Total Net Present Value Cost of Alternative[c]	**$ 463,000,000**	**$ 709,000,000**	**$ 568,000,000**	**$ 884,000,000**

Notes:

[a] Discount Factors for Construction Costs were applied to each SMA and Alternative based on construction sequencing assumptions. For a breakdown of discount factors by SMA and Alternative see Table 2, Appendix K of the LWG FS submitted to EPA March 30, 2012.

[b] Discount Factors for Long Term Monitoring, Maintenance, Operations, and Institutional Controls were applied on an Alternative-wide basis assuming that monitoring operations for some SMAs would commence prior to the completion of all remedial activities for a particular Alternative.

[c] The Total Net Present Value Cost for each Alternative is the sum of the Discounted Construction Costs, and the Discounted Long Term Monitoring, Maintenance, Operations, and Institutional Controls Costs.

Table 10. Alternative F Summary of Construction Quantities, Construction Costs and Long Term Monitoring, Maintenance, Operations, and Institutional Controls

Construction Quantities and Costs

Tasks	Unit Costs	Units	Integrated - Low		Integrated - High		Removal Focused - Low		Removal Focused - High	
			Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost
Direct Construction Costs										
Mobilization and Demobilization	15%	%	-	$ 53,720,000	-	$ 102,117,000	-	$ 90,302,000	-	$ 164,361,000
Debris Removal & Disposal	$11,630.00	ACRE	18	$ 210,000	18	$ 210,000	25	$ 289,000	25	$ 289,000
Pile Removal & Disposal	$635.00	PILE	1	$ 1,000	1	$ 1,000	33	$ 21,000	33	$ 21,000
Pile Replacement	$6,636.00	PILE	43	$ 285,000	43	$ 285,000	250	$ 1,659,000	250	$ 1,659,000
Temporary Dock Relocation	$89,173.00	Dock	14	$ 1,248,000	14	$ 1,248,000	22	$ 2,004,000	22	$ 2,004,000
Dredging & Transport to Offloading Facility			-		-		-		-	
Purchase, Install and Maintain Silt Curtains	$86.00	LF	-	$ -	-	$ -	-	$ -	-	$ -
Dredging			-		-		-		-	
Open water	$33.80	CY	1,845,609	$ 62,382,000	2,867,361	$ 96,917,000	3,507,163	$ 118,542,000	5,401,173	$ 182,560,000
Confined or shallow water	$47.70	CY	-	$ -	-	$ -	173,030	$ 8,254,000	250,365	$ 11,942,000
Dredging from shore	$41.60	CY	-	$ -	-	$ -	24,409	$ 1,015,000	39,783	$ 1,655,000
Residual Dredging	$79.60	CY	283,743	$ 22,586,000	283,743	$ 22,586,000	490,753	$ 39,064,000	490,753	$ 39,064,000
Miscellaneous			-		-		-		-	
Stabilization	$31.30	CY	-	$ -	-	$ -	-	$ -	-	$ -
Barge Transportation	$126.00	MILE	-	$ -	-	$ -	-	$ -	-	$ -
Hydraulically Offloading	$5.60	CY	2,129,352	$ 11,924,000	-	$ -	4,167,129	$ 23,336,000	-	$ -
Capping										
Material Purchase and Deliver										
Base Cap - Sand	$14.60	TON	362,937	$ 5,299,000	845,223	$ 12,340,000	501,033	$ 7,315,000	501,033	$ 7,315,000
Armor A material	$18.00	TON	-	$ -	129,317	$ 2,328,000	1,495	$ 27,000	1,495	$ 27,000
Armor B material	$18.00	TON	213,091	$ 3,836,000	375,142	$ 6,753,000	108,906	$ 1,960,000	108,906	$ 1,960,000
Armor C material	$18.00	TON	-	$ -	3,646	$ 66,000	525	$ 9,000	525	$ 9,000
Armor ODOT 200 material	$31.50	TON	426,183	$ 13,425,000	585,061	$ 18,429,000	145,036	$ 4,569,000	145,036	$ 4,569,000
Cap Material Placement										
Open Water Placement										
Base Cap - Open Water	$17.60	TON	142,061	$ 2,500,000	490,881	$ 8,640,000	86,725	$ 1,526,000	86,725	$ 1,526,000
Armor - Open Water	$15.50	TON	639,274	$ 9,909,000	822,370	$ 12,747,000	48,392	$ 750,000	145,828	$ 2,260,000
Organoclay Mat - Open Water (Purchase and Place)	$6.30	SF	-	$ -	620,160	$ 3,907,000	-	$ -	-	$ -
EMNR Layer - Open Water	$22.00	TON	6,446	$ 142,000	6,446	$ 142,000	6,446	$ 142,000	6,446	$ 142,000
Residuals Cap - Open Water	$22.00	TON	212,807	$ 4,682,000	212,807	$ 4,682,000	355,208	$ 7,815,000	355,208	$ 7,815,000
Backfill - Open Water	$17.60	TON	-	$ -	-	$ -	-	$ -	-	$ -
Confined or Under Pier Placement										
Base Cap	$36.20	TON	-	$ -	133,466	$ 4,831,000	94,209	$ 3,410,000	94,209	$ 3,410,000
Armor	$32.00	TON	-	$ -	270,796	$ 8,665,000	95,858	$ 3,067,000	95,858	$ 3,067,000
Organoclay Mat (Purchase and Place)	$21.10	SF	-	$ -	91,220	$ 1,925,000	-	$ -	-	$ -
EMNR Layer	$45.30	TON	1,623	$ 74,000	1,623	$ 74,000	1,623	$ 74,000	1,623	$ 74,000
Residuals Cap	$45.30	TON	-	$ -	-	$ -	12,857	$ 582,000	12,857	$ 582,000
Backfill	$36.20	TON	-	$ -	-	$ -	-	$ -	-	$ -
In Situ Treatment										
In Situ Treatment - Open Water	$4.50	SF	3,528,251	$ 15,877,000	-	$ -	-	$ -	-	$ -
In Situ Treatment - Confined/Underpier	$5.80	SF	1,579,806	$ 9,163,000	-	$ -	-	$ -	-	$ -

Table 10. Alternative F Summary of Construction Quantities, Construction Costs and Long Term Monitoring, Maintenance, Operations, and Institutional Controls

Construction Quantities and Costs

Tasks	Unit Costs	Units	Integrated - Low		Integrated - High		Removal Focused - Low		Removal Focused - High	
			Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost
DSL Land Purchase	$142,876.80	ACRE	39	$ 5,539,000	143	$ 20,401,000	32	$ 4,514,000	32	$ 4,514,000
Mitigation (1)										
On site	$2,260,000.00	ACRE	-	$ -	28.59	$ 64,616,000	-	$ -	16.52	$ 37,345,000
Off site	$350,000.00	ACRE	5.45	$ 1,908,000	-	$ -	3.19	$ 1,117,000	-	$ -
Disposal										
Upland Subtitle D	$79.00	TON	89,846	$ 7,098,000	4,620,653	$ 365,032,000	283,758	$ 22,417,000	8,937,367	$ 706,052,000
Upland Subtitle C	$226.00	TON	-	$ -	106,004	$ 23,957,000	-	$ -	335,745	$ 75,878,000
In-Water CDF	$87.00	CY	2,069,455	$ 180,043,000	-	$ -	4,006,184	$ 348,538,000	-	$ -
Total Direct Construction Costs			**-**	**$ 411,851,000**	**-**	**$ 782,899,000**	**-**	**$ 692,318,000**	**-**	**$ 1,260,100,000**
Indirect Construction Costs			-		-		-		-	
Design	15%	%	-	$ 61,778,000	-	$ 117,435,000	-	$ 103,848,000	-	$ 189,015,000
Daily Responsible Party oversight and project management	$292,000.00	Monthly	261	$ 76,099,000	294	$ 85,988,000	468	$ 136,780,000	481	$ 140,357,000
Daily Agency Oversight and Project Management including Environmental Monitoring	$100,000.00	Monthly	261	$ 26,061,000	294	$ 29,448,000	468	$ 46,842,000	481	$ 48,067,000
Engineering Support During Construction	$78,000.00	Monthly	261	$ 20,328,000	294	$ 22,969,000	468	$ 36,537,000	481	$ 37,493,000
Special Insurance, Bonding	5%	%	-	$ 20,593,000	-	$ 39,145,000	-	$ 34,616,000	-	$ 63,005,000
Total Indirect Construction Costs			**-**	**$ 204,859,000**	**-**	**$ 294,985,000**	**-**	**$ 358,623,000**	**-**	**$ 477,937,000**
Total Capital Costs			**-**	**$ 616,710,000**	**-**	**$ 1,077,884,000**	**-**	**$ 1,050,941,000**	**-**	**$ 1,738,037,000**
Contingency	**40%**	**%**	**-**	**$ 164,740,000**	**-**	**$ 313,160,000**	**-**	**$ 276,927,000**	**-**	**$ 504,040,000**
Engineer's Opinion of Probable Cost (Non-Discounted Construction Costs)			**-**	**$ 781,450,000**	**-**	**$ 1,391,044,000**	**-**	**$ 1,327,868,000**	**-**	**$ 2,242,077,000**
Average Discount Factor[1]				**0.83**		**0.84**		**0.73**		**0.74**
Discounted Construction Costs				**$ 651,000,000**		**$ 1,168,000,000**		**$ 974,000,000**		**$ 1,659,000,000**

Long Term Monitoring, Maintenance, Operations, and Institutional Controls Costs

Category	Integrated - Low	Integrated - High	Removal Focused - Low	Removal Focused - High
Non-Discounted Long Term Monitoring, Maintenance, and Operations Costs	**$ 327,000,000**	**$ 316,800,000**	**$ 165,000,000**	**$ 165,000,000**
Non-Discounted Institutional Controls Costs	**$ 14,600,000**	**$ 14,600,000**	**$ 13,800,000**	**$ 13,800,000**
Average Discount Factor[2]	**0.66**	**0.67**	**0.57**	**0.57**
Discounted Long Term Monitoring, Maintenance, Operations, and Institutional Controls Costs	**$ 227,100,000**	**$ 220,600,000**	**$ 102,500,000**	**$ 102,500,000**

Total Net Present Value Cost of Alternative[c]	**$ 878,000,000**	**$ 1,389,000,000**	**$ 1,077,000,000**	**$ 1,762,000,000**

Notes:

[a] Discount Factors for Construction Costs were applied to each SMA and Alternative based on construction sequencing assumptions. For a breakdown of discount factors by SMA and Alternative see Table 2, Appendix K of the LWG FS submitted to EPA March 30, 2012.

[b] Discount Factors for Long Term Monitoring, Maintenance, Operations, and Institutional Controls were applied on an Alternative-wide basis assuming that monitoring operations for some SMAs would commence prior to the completion of all remedial activities for a particular Alternative.

[c] The Total Net Present Value Cost for each Alternative is the sum of the Discounted Construction Costs, and the Discounted Long Term Monitoring, Maintenance, Operations, and Institutional Controls Costs.

Source:

1. As presented in Table 2, Appendix K, LWG FS March 30, 2012
2. Assumes a discount rate of 2.3%. Long Term Monitoring and Maintenance occurs in each SMA following completion of construction in that alternative
3. The discounted costs will sum to the values presented in Table 2, Appendix K.